THE IMPACT OF HEAT AND HEAT-WAVE EPISODES IN EUROPEAN CITIES

Daniela D'Ippoliti, *Department of Epidemiology – Lazio Regional Health Service, Italy*
Paola Michelozzi, *Department of Epidemiology – Lazio Regional Health Service, Italy*
Claudia Marino, *Department of Epidemiology – Lazio Regional Health Service, Italy*
Michela Leone, *Department of Epidemiology – Lazio Regional Health Service, Italy*
on behalf of the EU-funded EuroHeat Project

Background and aims: In recent years several EU projects (PHEWE, EuroHeat, CIRCE) investigated the impact of high temperatures and heat-waves producing a broad description of health effects in European cities. Since these projects used two different approaches, time-series and episode analyses, results are not easily comparable.
The EuroHeat project evaluated the impact of heat-waves on mortality during the 1990-2004 years in 9 European cities, comparing estimates with a standardized definition of heat-wave and results showed large heterogeneity of the effect among cities.
In this analysis an integrated approach is used to evaluate the increase in risk due to both the effect of daily temperatures and heat-waves in the EuroHeat cities.

Methods: The impact of high temperatures on mortality is investigated using distributed lag nonlinear functions of temperature (DLNM models) including an indicator term for heat-wave (defined as 2 or more consecutive days with maximum apparent and minimum temperature above the 90th monthly percentile). The effect is estimated as percent increase in daily mortality in the elderly (65+ years) and for different duration of heat-waves.

Results: Results of the EuroHeat study showed great geographical heterogeneity of the effect of heat-waves among cities. The increase in mortality was up to 3-times greater during heat-waves of long duration and high intensity. Results showed a greater impact in Mediterranean (+21.8% total mortality) than in North-Continental (+12.4%) cities, whereas the heat-wave impact was stronger in North-Continental cities in 2003. These results are compared with estimates decomposed in the two components of risk due to the effect of daily temperatures and heat-waves.

Conclusions: This additional analysis provides a more complete and comparable evaluation of the heat effect on mortality in European cities, jointly estimating the effect of daily temperatures and heat-waves. Furthermore, results allow comparisons for nonlinear delayed effects of temperatures and harvesting.